



Preventing the Spread of Quagga and Zebra Mussels

A Time for Action

Quagga and Zebra Mussels

An Overview



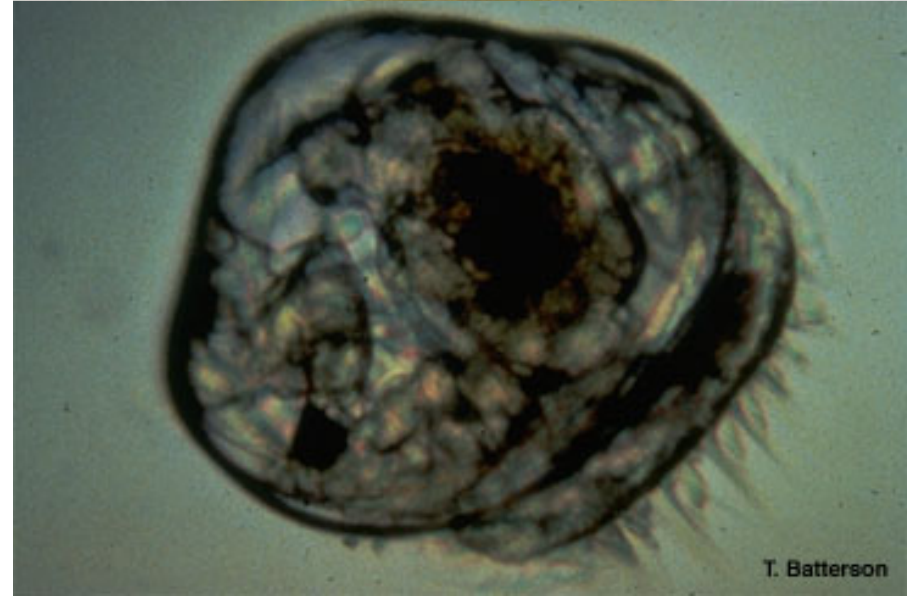
Description

- Freshwater bivalve
- Small, banded or solid color pattern
- Free-floating larval stage (veligers)



Impacts

- Destroy fisheries
- Damage boats
- Cripples water systems
- Costs could be billions



Range in California



Quagga Mussel

Jan 07	Colorado River
Mar 07	San Bernardino Co.
Jul 07	Riverside Co.
Aug 07	San Diego Co.
Feb 08	Imperial Co.
Apr 08	Orange Co.

Zebra Mussel

Jan 08	San Benito Co.
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Addressing the Invasion- Incident Overview



- Discovered in Lake Mead, Jan '07
- Found in Lake Havasu, MWD diversion intake structure
- DFG led Incident Command to coordinate response
- Funding allocated
- Statewide surface surveys
- Convened Science Advisory Panel



Fish and Game

Code and Regulations



- Restrictions on importation, possession and transport of live animals
- Inspection of conveyances
- Response Plans
- Prevention Programs
- Enforcement Authority
 - CDFA and PARKS (12 Parks)
 - Authority can only be delegated to other state agencies
 - Legislation required to grant local agencies authority

DFG's Mussel Management Strategy Goals



Prevent further introductions into the State

Contain mussels within currently infested waters

Eradicate mussels from infested waters if feasible



Strategy Objectives: Coordination & Collaboration



National and Regional Level

- Invasive Species Advisory Committee
- National Invasive Species Council
- Western Regional Panel on Aquatic Nuisance Species
- 100th Meridian Initiative
- Aquatic Nuisance Species Task Force

Strategy Objectives: Coordination & Collaboration



State Level

- Invasive Species Council of California
- California Invasive Species Advisory Committee
- California Agencies Aquatic Invasive Species Team
- Quagga/Zebra Mussel Interagency Team

Local Level

- DFG Regional Scientists coordinate with and assist local agencies

Strategy Objectives: Coordination & Collaboration



Quagga/Zebra Mussel Interagency Team

State Agencies

Fish and Game
Food and Agriculture
Water Resources
State Parks
Boating and Waterways
CalFire
CalTrans
Water Resources
Control Board
State Lands Commission

Federal Agencies

Fish and Wildlife Service
Bureau of Reclamation
National Parks Service
Forest Service
Army Corps of Engineers
Bureau of Land
Management
US Geological Survey

Local Agency

Metropolitan Water
District of Southern
California

Strategy Objectives: Prevention



Invasion Process

Source species pool



Transport



Introduction



Establishment



Spread

Strategy Objectives: Prevention

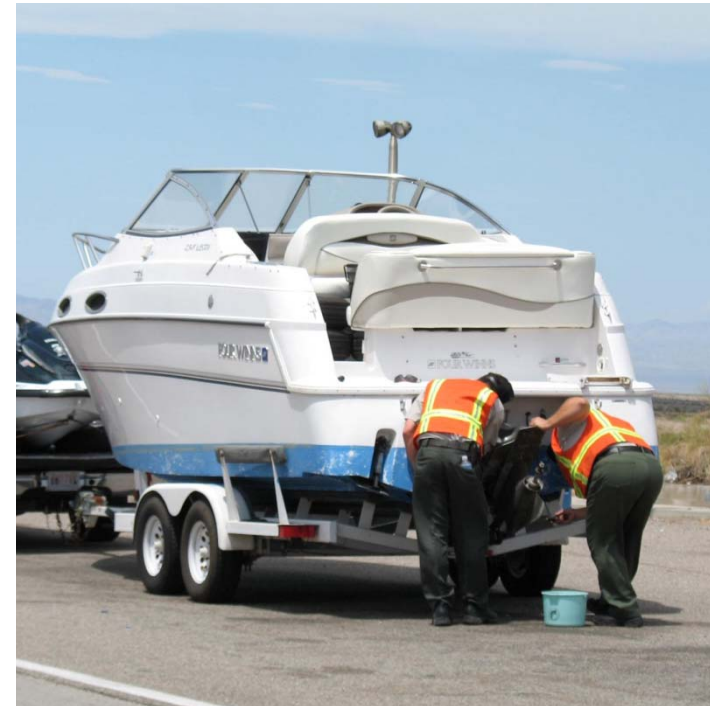


Prevention Programs

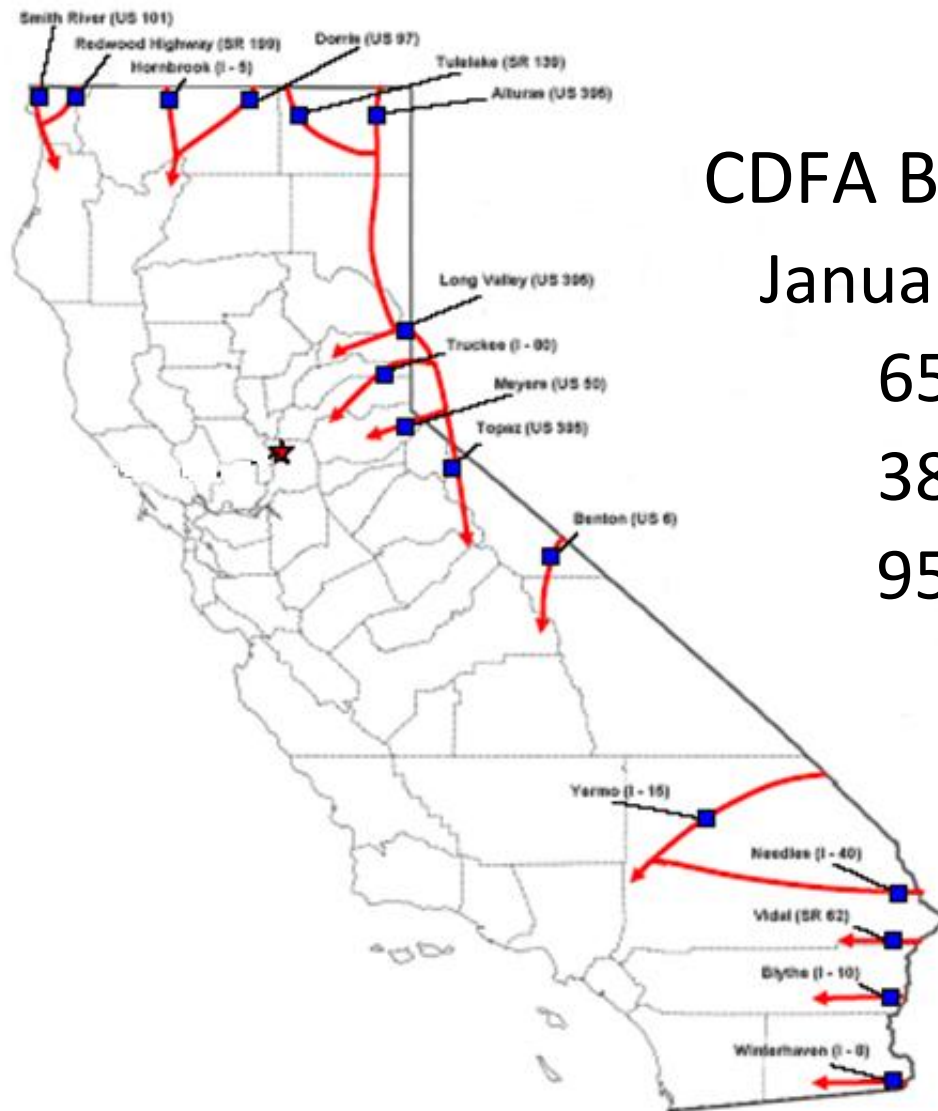
- >250 of Water Agencies in CA

Existing Resources

- Invasive Mussel Guidebook for Recreational Water Managers and Users
- Recommended Protocols and Standards for Watercraft Interception Programs (UMPS)



Strategy Objectives: Prevention



CDFA Border Protection Stations

January 2007 – October 2011

658,821 vessels inspected

38,062 vessels cleaned

959 vessels with mussels

Strategy Objectives: Prevention



Inspections & Quarantine

- DFG Regional Scientists
 - Inspect and release quarantined vessels
- Local Programs
 - Bay Area Consortium
 - Lake Tahoe
 - State Parks



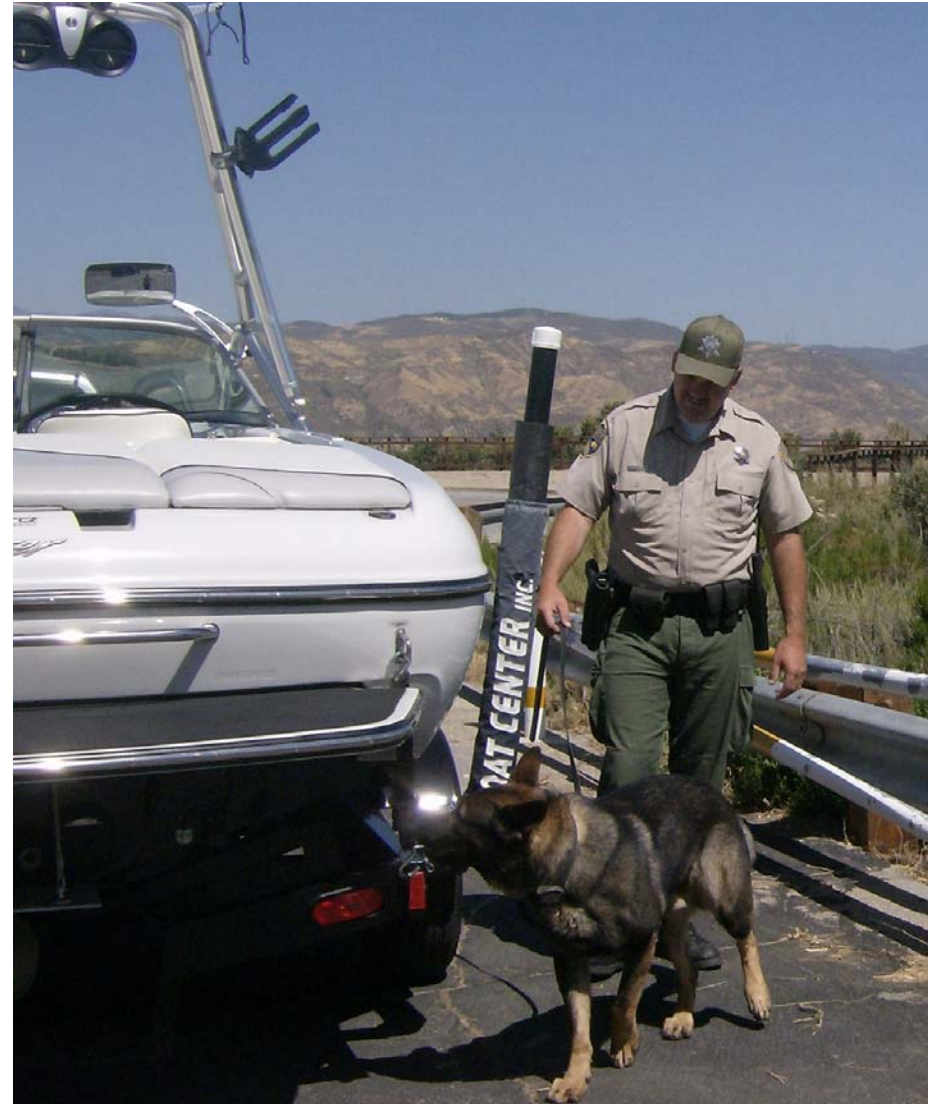
Photo by East Bay Municipal Utility District

Strategy Objectives: Prevention



DFG K-9 Units

- Teams trained to locate certain odors and evidence
- Currently 20 dogs in the program
- Trained to detect adult quagga and zebra mussels



Strategy Objectives: Prevention



Strategy Objectives: Prevention



Dreissenid Mussel Summit

- October 2010
- Coordinated by Gregory Giusti, UC Cooperative Extension
 - Summit Report: A Pathway to Reciprocity

Watercraft Inspection and Decontamination Trainings

- DFG Led
- Train the Trainer

Strategy Objectives: Prevention



Addressing Other Vectors

Vector	Agency	Action
Tournaments	DFG	Special Conditions in Permits Organize Watercraft Inspections
Marinas	DFG	Mailing to marinas throughout CA Special Procedures for Forever Resorts
Commercial Haulers	DFG & PSMFC	Survey & Letter
Sea Planes	Multi-Agency	DVD
Live Bait	DFG	Modified Regulations
Aquaculture	DFG	Meeting & Guidance Document DFG Hatcheries implementing protocols
Researchers	DFG	Scientific Collecting Permits
Fire Equipment	CalFire & US Forest Service	Guidelines available on website

Strategy Objectives: Prevention



Ongoing Research

- DFG
 - Veliger Survivability
 - Angler Survey
- DWR State Water Project
 - Calcium and pH vulnerability analysis

Strategy Objectives: Prevention

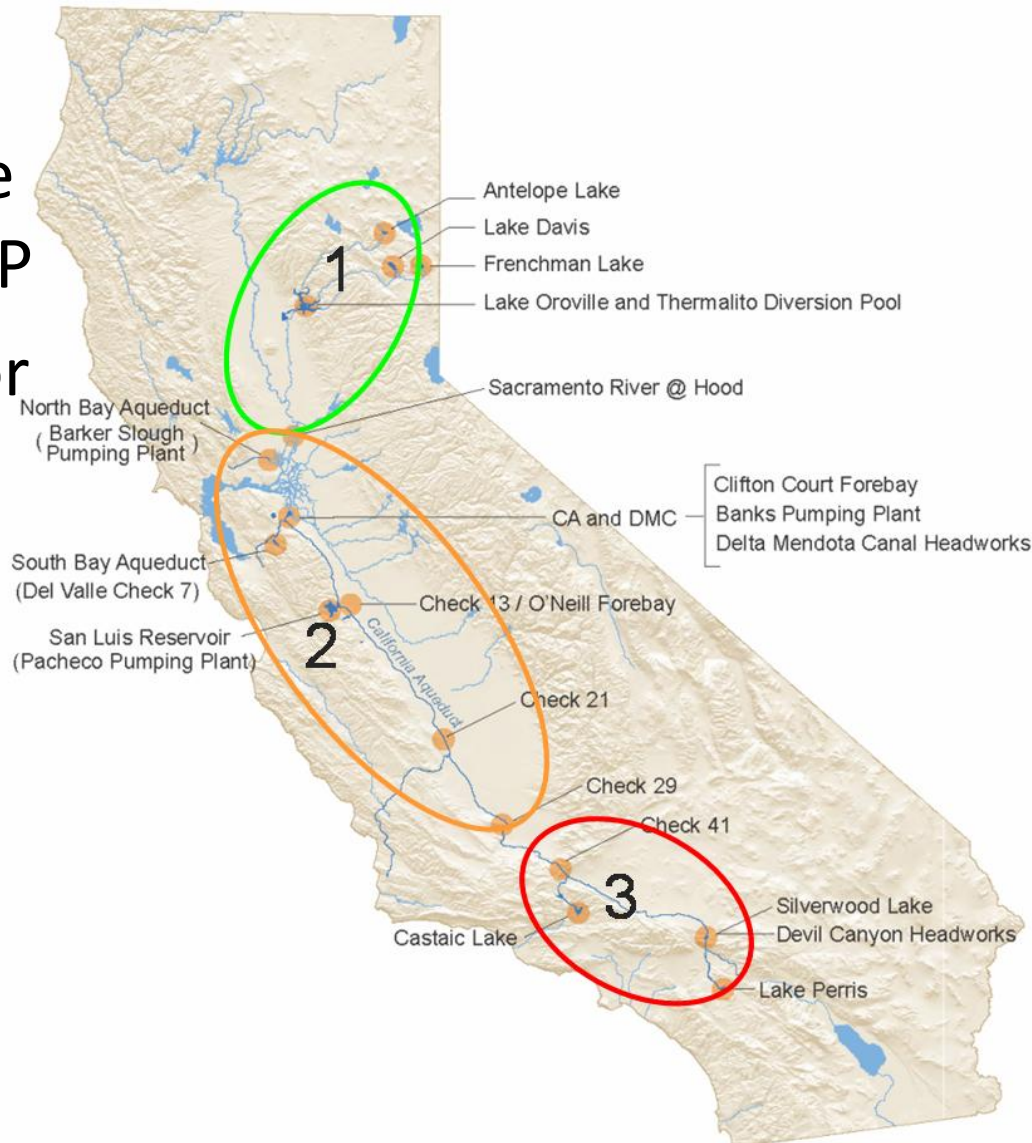


DWR and RNT Consulting
Research: Assessing the
Vulnerability of the SWP

Zone 1 – Unsuitable for
mussels

Zone 2 – May support
mussels

Zone 3 – Capable of
supporting mussels



Strategy Objectives: Detection



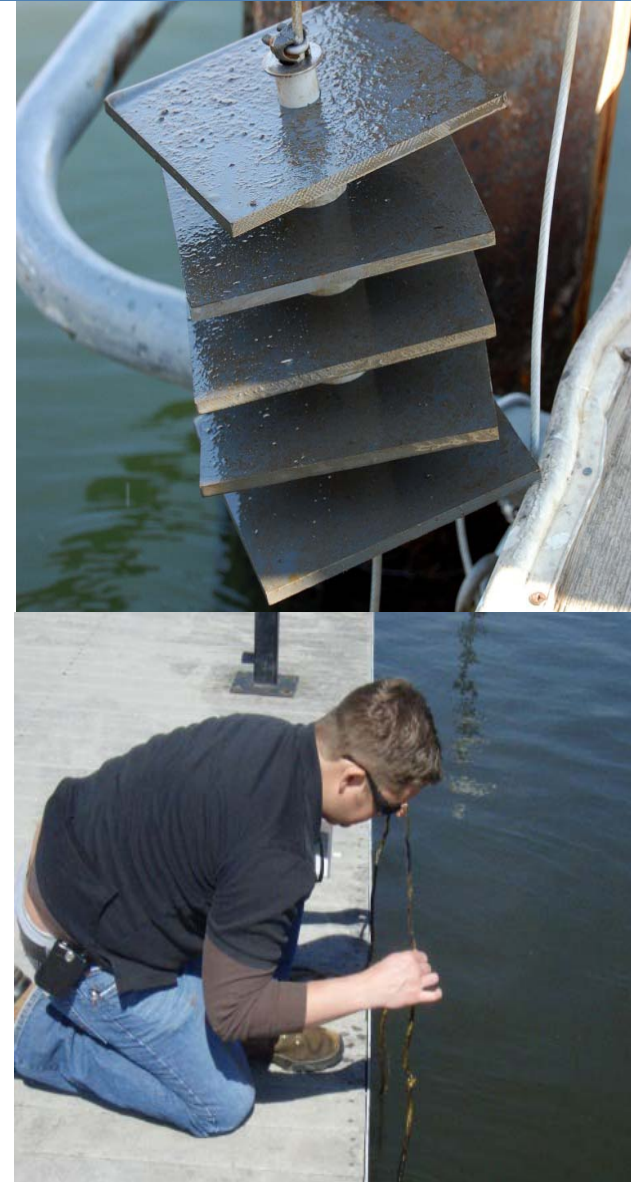
Vulnerability Analysis

Early Detection Monitoring

- Training

Sample Analysis and Identification

- UC Davis Bodega Marine Laboratory



Strategy Objectives: Control & Eradication



Response Plans

- 23 infested reservoirs with some type of program in place

Research

- Marrone Bio Innovations
 - Zequanox
- DWR/RNT Consulting, Inc.
 - pH Manipulation Study



Strategy Objectives: Information Dissemination



Outreach & Education

- DFG Quagga/Zebra Mussel Hotline: (866) 440-9530
- Website: www.dfg.ca.gov/quaggamussel/
- Events
- Press Releases/PSAs/Radio Shows

Strategy Objectives: Information Dissemination



Posters and Rack Cards

THE MUSSELS ARE HERE!

What you can't see will ruin your boat

DON'T MOVE A MUSSEL!

Mussels will ruin your boat, fisheries and California waters!

This...



Microscopic



When leaving the water:

- **Inspect** all exposed surfaces - small mussels feel like sandpaper to the touch.
- **Wash** the hull of each watercraft thoroughly.
- **Remove** all plants and animal material.
- **Drain** all water and **dry** all areas.
- **Drain** and **dry** the lower outboard unit.
- **Clean** and **dry** all live-wells.
- **Empty** and **dry** any buckets.
- **Dispose** of all bait in the trash.
- **Wait** 5 days in hot weather and up to 30 days when cool and moist. Keep watercraft dry between launches into different fresh waters.



Smartphone scan for more information

REPORT MUSSEL FINDS TO 866-440-9530
VISIT www.dfg.ca.gov/invasives/quaggamussel

LOOK FOR MUSSELS HERE



CHECK YOUR BOAT, TRAILER AND VEHICLE

DON'T MOVE A

Clean, drain, dry boat
Dispose of live bait
Dry 5 days in hot weather & up to 30 days when cool and moist.

Protect your boat, fisheries and the environment
MUSSEL HOTLINE 866-440-9530
www.dfg.ca.gov/invasives/quaggamussel


DON'T MOVE A MUSSEL!

Quagga/zebra mussels
ruin boats and destroy waters

DON'T LET THEM RIDE WITH YOU!

Watercraft and equipment can move quagga and zebra mussels from infested waterbodies to uninfested waterbodies. If spread, these mussels can:

- Encrust boat hulls, clog cooling systems, jam steering equipment
- Alter aquatic ecosystems, resulting in fewer native species and sportfish
- Litter beaches with sharp, foul smelling shells
- Clog water distribution systems, resulting in higher utility bills



Strategy Objectives: Information Dissemination



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Quagga - Zebra Mussel Information



Information Line: (866) 440-9530

Prevent spreading quagga and zebra mussels by following these steps every time you remove a vessel from the water:

- Physically inspect all exposed surfaces of your boat or watercraft. Very small quagga/zebra mussels will feel like sandpaper to the touch.
- Remove aquatic plants from watercraft, motor, and trailer. Check all underwater fittings and equipment, such as rollers, axle, bilge, and trailer, and above water equipment, such as anchors, and, live wells. Dispose of aquatic plants in the trash.
- Dispose of unused live bait in the trash.
- For personal watercraft, impeller areas can contain quagga/zebra mussels and aquatic plants. Once on the trailer, run the engine for five to 10 seconds to blow out excess water, mussels and plants.
- Drain all water from the watercraft including from the motor, bilges, live wells, and bait buckets.
- Thoroughly wash the hull and all water tanks. This is especially important if the watercraft has been moored for more than a day.
- Preferably wash with a hot water, high-pressure hose, but if unavailable any potable water source is better than nothing.
- If a trailer was used to remove the watercraft from the water, thoroughly wash the trailer as well.
- Drain all wash water and dry the watercraft and trailer.
- Watercraft should remain dry and out of water for a minimum of five days or longer between launches.
- Exercise patience at watercraft inspections. If you have followed these steps you have improved the likelihood you will breeze through an inspection.

[Use Regular Site](#)

Strategy Objectives: Information Dissemination



- Quarterly newsletter
- Informs public about activities related to invasive species
- Subscribe by emailing Invasives@dfg.ca.gov



DFG Contact Information

Information Hotline
(866) 440-9530

Website

<http://www.dfg.ca.gov/quaggamussel/>